

DR. EVA C. HERBST

POSTDOCTORAL FELLOW IN SHOULDER BIOMECHANICS, ETH

ADDRESS: Laboratory for Orthopaedic Technology, ETH
GLC H22, Gloriastrasse 37/39, 8006 Zurich, Switzerland

EMAIL: eva.herbst@hest.ethz.ch

[Website](#) - [GoogleScholar](#) - [Github](#) - [Figshare](#) - [Morphosource](#) - [Publons](#) - [Orcid](#)

EDUCATION

OCT 2016 - APRIL 2020 | PhD in Biomechanics and Palaeontology
Structure and Motion Lab, Royal Veterinary College, London

AUGUST 2012 - MAY 2016 | B.A. in Integrative Biology
U.C. Berkeley

OCT 2013 - JUNE 2014 | Degree of Higher Education in Biomedical Sciences
Durham University, Year of Study Abroad, Certificate of Higher Education

EMPLOYMENT & RESEARCH EXPERIENCE

MAR 2023 - PRESENT | Postdoctoral Fellow
Computational Shoulder Biomechanics, ETH and Schulthess Clinic, Zurich

DEC 2019 - NOV 2022 | Postdoctoral Researcher
Investigating form and function of Triassic reptile skulls, Palaeontological Institute and Museum, University of Zurich

OCT 2019 - DEC 2021 | Lead Researcher OATech+ Network Pump Priming Project
*Analysing bony architecture to monitor osteoarthritis of the knee
Royal Veterinary College, London and University of Zurich*

OCT 2019 - DEC 2019 | OATech+ Network Early Career Researcher Placement
Osteoarthritis project, Skeletal Biology Group, Royal Veterinary College London

OCT 2016 - APRIL 2020 | PhD in Palaeontology and Biomechanics
Structure and Motion Lab, Royal Veterinary College, London

MAY 2016 - JUL 2016 | National Science Foundation Research Experience for Undergraduates Project: *Comparative Biomechanics, Palaeontology, and Evolution, University of Missouri*

SEP 2015 - MAY 2016 | Undergraduate Research Apprenticeship Program
Hummingbird Flight Analysis, U.C. Berkeley

SEP 2014 - MAY 2016 | Research Assistant and Archivist
Human Evolution Research Center, U.C. Berkeley

JUN 2013 - MAY 2016 | Research Intern and Staff
Safari West Osteology, Santa Rosa, California

SEP 2014 - MAY 2015 | Undergraduate Research Apprenticeship Program
Rodent Mandible Morphology Project, U.C. Berkeley

HONORS & AWARDS

2021	D. Dwight Davis Award, Society of Integrative and Comparative Morphology Best student oral presentation in the Division of Vertebrate Morphology
2020	Swiss Commission of Palaeontology Prize Best presentation in palaeontology given at the Swiss Geoscience Meeting
2016	Franklin M. Henry Award, Integrative Biology, UC Berkeley Outstanding achievement in human performance and health research
2016	Distinction in General Scholarship, UC Berkeley Awarded to graduates achieving high grade point average
2013, 2015	Dean's Honors, UC Berkeley Awarded to graduates achieving high grade point average

PEER-REVIEWED PUBLICATIONS

* denotes co first author

2023	Merten, L.J.F, Manafzadeh, A.R., Herbst, E. C. , Amson, E., Tambusso, P.S., Arnold, P., Nyakatura, J.A. The functional significance of aberrant cervical counts in sloths: insights from automated exhaustive analysis of cervical range of motion. <i>Proc. R. Soc. B.</i>
2023	Herbst, E. C.* , Evans, L.A.*, Felder, A.A., Javaheri, B. and Pitsillides, A.A. 3D profiling of mouse epiphyses across ages reveals new potential imaging biomarkers of early spontaneous osteoarthritis. <i>Journal of Anatomy</i>
2023	Demuth, O. E., Herbst, E. C. , Polet, D. T., Wiseman, A. L. A., Hutchinson, J. R. Modern three-dimensional digital methods for studying locomotor biomechanics in tetrapods. <i>Journal of Experimental Biology</i>
2022	Herbst, E. C. , Lautenschlager, S., Fioritti, N., Meade, L., Scheyer, T.M. A toolbox for the retrodeformation and muscle reconstruction of fossil specimens in Blender. <i>Royal Society Open Science</i>
2022	Herbst, E. C. , Eberhard, E., Richards, C., Hutchinson, J.R. <i>In vivo</i> and <i>ex vivo</i> range of motion in the fire salamander <i>Salamandra salamandra</i> . <i>Journal of Anatomy</i>
2022	Herbst, E. C.* , Eberhard, E.*, Hutschinson, J. R., Richards, C. Spherical frame projections for visualizing joint range of motion, and a complementary method to capture mobility data. <i>Journal of Anatomy</i>
2022	Herbst, E. C.* , Manafzadeh, A. R.*, Hutchinson, J. R. Multi-joint analysis of pose viability and supports the possibility of salamander-like hindlimb configurations in the Permian tetrapod <i>E. megacephalus</i> . Student Awardee Paper. <i>Journal of Integrative and Comparative Anatomy</i>
2021	Herbst, E. C. , Lautenschlager, S., Bastiaans, D., Miedema, F., Scheyer, T. M. Modeling tooth enamel in FEA comparisons of skulls: comparing common simplifications with biologically realistic models. <i>iScience</i> 24(11)
2021	Herbst, E. C. , Felder, A. A., Evans, L. A. E., Ajami, S., Javaheri, B., Pitsillides, A. A. A new straightforward method for semi-automated segmentation of trabecular bone from cortical bone in diverse and challenging morphologies. <i>Royal Society Open Science</i> 8(8). Our image was selected for the journal cover

- 2020 | Ortega-Jimenez, V. M., **Herbst, E. C.**, Leung, M. S., and Dudley, R. Natural barriers: waterfall transit by small flying animals. *Royal Society Open Science* 7201185
- 2019 | **Herbst, E. C.**, Doube, M., Smithson, T. R., Clack, J., and Hutchinson, J. R. Bony lesions in early tetrapods and the evolution of mineralized tissue repair. *Paleobiology* 45(4)
- 2010 | **Herbst, E. C.** and Hutchinson, J. R. New insights into the morphology of the Carboniferous tetrapod *Crassigyrinus scoticus* from computed tomography. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh* 109(1-2)

GRANTS & FUNDING

- 2023 | **Digital Switzerland Boost Programme**
grant for attending Advanced 3D Slicer Programming Course
Funds: 420 CHF
- 2021 | **ImagingBioPro Network Online Educational Material Grant**
development of educational materials (videos and guides) and code: [mesh manipulation](#) and [trabecular segmentation](#)
Funds: 1,000 GBP
- 2020 | **University of Zurich GRC Grant**
Project: organized and hosted finite element analysis [conference](#) and [workshop](#) with over 200 participants and developed a [website](#) and [Github organisation](#) for sharing finite element modeling methods
Funds: 10,000 CHF
- 2019 | **OATech+ Network Biomechanics and Mechanobiology Pump Priming Fund**
Project: Using 3D trabecular architecture as a biomarker to identify and monitor osteoarthritis of the knee
Funds: 10,000 GBP
- 2019 | **OATech+ Network Early Career Researcher Placement**
Placement with Prof Andrew Pitsillides at RVC to work on osteoarthritis project (see above)
Funds: 3,000 GBP
- 2019 | **Royal Veterinary College Foreign Travel Fund**
To present research at ICVM conference
Funds: 300 GBP
- 2018 | **Royal Veterinary College Foreign Travel Fund**
To present research at SICB conference
Funds: 300 GBP
- 2016 | **Research Experience for Undergraduates, National Science Foundation**
Biomechanics research internship, University of Missouri
Funds: 3,500 USD

CONFERENCE PRESENTATIONS & INVITED TALKS AND WORKSHOPS

- gave 10 invited talks and 10 international conference presentations, and collaborator or mentor on 13 additional conference presentations
- winner of 2 awards for best talk
- please see a full list of my talks [here](#)

TEACHING & SUPERVISION

TEACHING	<ul style="list-style-type: none">• Bio 262: Evolutionary Morphology of Vertebrates: Issues and Methods, University of Zurich. Leader of Practicals. 2021,2022• Bio 267, Paleobiology and Evolution of Vertebrates, University of Zurich. Leader of Practicals, 2021,2022• Lectures: <i>Using Computer Tools to Investigate Biomechanics of Animals</i>, Bio 262 & 267, 2020-2022.
SUPERVISION	<ul style="list-style-type: none">• supervision of 2 Master's thesis projects and 1 Master's semester project in Biomechanics, ETH (current)• Kehan Pan, Semester Project FEA, ETH, Zurich (2022)• Dylan Bastiaans, PhD student Digital Palaeontology and Biomechanics, UZH (2019-2023)• student course projects in Bio 262 and 267, UZH (2019-2022)
TUTORING	<ul style="list-style-type: none">• Postgraduate Writing Tutor, Royal Veterinary College, London (2017-2019)• Private Tutor (Writing, Math)

TECHNICAL SKILLS & PROGRAMS

CT SEGMENTATION AND 3D MODELING	Mimics, Avizo, Blender, Rhino, photogrammetry
ANALYSIS AND SCRIPTING	Matlab, Python, Java
FINITE ELEMENT ANALYSIS & MULTIBODY DYNAMICS	Hypermesh, Abaqus, Artisynt
SCIENTIFIC ROTOSCOPING AND ANIMATION	Maya
MOTION CAPTURE	Qualysis and Matlab
VERSION CONTROL, FORMATTING	Git, Latex
OTHER	Joint dissections

OPEN ACCESS WORK

NEW METHODS/CODE	<ul style="list-style-type: none">• Python-based Blender plugin for modelling 3D muscles• method for visualizing joint range of motion• method for automatic segmentation of trabecular bone featured in Avizo webinar• Blender remeshing guide for FEA
FEZ INITIATIVE	Founder of Finite Element Zurich
CT DATA AND 3D MODELS	available on Morphosource and Figshare
OPEN ACCESS COURSE	Completed Open Life Science Program fall 2020

PROFESSIONAL SERVICE & LEADERSHIP

2021 - PRESENT	Leading Artisynt Software Discussion Group
2020	organized Finite Element Analysis Conference and Workshop (200+ participants)
2018	Session Chair, Society of Integrative and Comparative Biology Annual Meeting, San Francisco.

PEER REVIEW | PNAS, Clinical Biomechanics, The Anatomical Record, Journal of Anatomy, Integrative Organismal Biology, Methods in Ecology and Evolution Integrative and Comparative Biology, Canadian Journal of Earth Sciences

OUTREACH & VOLUNTEERING

2021 - PRESENT | Volunteering as English and Math tutor for refugees
Students Across Borders

2022 | Outreach video for [Biomechanics Research and Innovation Challenge](#)

2020 | [Interview](#) with Real Scientists DE (in German)

2019 | Outreach display, Early Tetrapod Evolution
Night at the Vet College, Royal Veterinary College, London

2017 | Outreach display, Early Tetrapod Evolution
Annual Open Day, Royal Veterinary College, London

2017 | Guest [blog post](#) about *Crassigyrinus* on Anatomy to You blog

2013-2016 | Comparative anatomy outreach events at Safari West Wildlife Park

PROFESSIONAL DEVELOPMENT & CERTIFICATES

2023 | Advanced 3D Slicer Course: Scripting and Customization, [Kitware](#)

2022 | Good Clinical Practice [online course](#) and certification

2022 | Data Analysis for Medical Research using R, UZH

2021 | [GAMMA](#) Workshop Balgrist, Zurich: "Models, methods and functional tests in motion analysis". Accredited by Swiss Orthopaedics (6 credits) and Physio Swiss (12 credits)

2021 | [Scientific Programming with Python](#), Physics Department, UZH

2020 | [Open Life Science Course](#)

2020 | [SlicerMorph 3D Morphometrics Course](#)

2019 | Avizo Course, 3DMAGINATION Ltd.

2018 | MatLab Fundamentals Course

2017 | Teaching and Learning in Higher Education Certificate, Royal Veterinary College, London

LANGUAGES

ENGLISH: | fluent

GERMAN: | fluent